Amendments to the Claims:

The listing of claims will replace all prior versions and listing of claims in the application:

1. (previously presented) A haploid fungal cell comprising:

a recombinant genome, the recombinant genome comprising a heterologous DNA functionally coupled to an eukaryotic recombination hotspot;

the haploid fungal cell being capable of being converted to a diploid fungal cell;

the heterologous DNA being adapted and configured within the recombinant genome for recombination in the diploid fungal cell.

2. (original) The haploid fungal cell of claim 1, wherein the fungal cell is *Neurospora crassa*, *S. cerevisiae*, or *S. pombe*.

3. (original) The haploid fungal cell of claim 1, wherein the haploid cell is a cell of a filamentous fungus, of a conidium or other asexual spore, an ascospore, zygospore, basidiospore or other sexual spore, mycelium, heterokaryon, dikaryon or homokaryon, or is a yeast cell.

4. (original) The haploid fungal cell of claim 1, wherein the recombination hot spot is *Neurospora crassa cog*, 3' of *his-3* and 3' of *am* in *Neurospora crassa*, 3' of *his4* and 3' of *arg4* in *S. cerevisiae*, or within *ade6* in *S. pombe*.

5. (original) The haploid fungal cell of claim 1, wherein the recombination hot spot is an allele of *Neurospora crassa cog*.

6. (original) The haploid fungal cell of claim 5, wherein the recombination hot spot is *Neurospora crassa* cog^{L}.

7. (original) The haploid fungal cell of claim 5, wherein the heterologous DNA is located between the *his-3* gene and *cog*.

8. (original) The haploid fungal cell of claim 1, wherein the heterologous DNA is a promoter, is a regulatory sequence, is a noncoding sequence, encodes all or part of a subunit of an immunoglobulin, all or part of a heteromultimeric protein, all or part of a homomultimeric protein, all or part of a monomeric protein, all or part of a non-transcribed DNA sequence, all or part of a sequence that regulates the activity of a gene, all or part of a sequence transcribed into an RNA molecule lacking catalytic activity, all or part of a sequence transcribed into an RNA molecule having catalytic activity, or a combination thereof.

9. (original) The haploid fungal cell of claim 1, wherein the fungal cell is *Neurospora crassa* of mating type *A* or type *a*.

10. (original) A pair of haploid fungal cells according to claim 1, wherein each cell carries the same allele of the genetic loci that determine heterokaryon compatibility, whereby the progeny of crosses of the pair of cells can form heterokaryons in any combination of like mating type.

11. (original) The pair of cells of claim 10, wherein each fungal cell is *Neurospora crassa* and each cell carries the same allele of the genetic loci *het-c, het-d, het-e, het-i, het -5, het-6, het-7, het-8, het-9*, and *het-10* .

12. (original) The haploid fungal cell of claim 1, wherein the fungal cell comprises a forcing marker for a heterokaryon formed from the haploid cell.

13. (original) The haploid fungal cell of claim 12, wherein the forcing marker comprises one or more auxotrophic mutations.

14. (original) The haploid fungal cell of claim 13, wherein the forcing marker leads to a requirement for tryptophan, pantothenic acid, thiamine, or arginine.

15. (original) The haploid fungal cell of claim 14, wherein the fungal cell is *Neurospora crassa* and the forcing marker is a mutation that inactivates a *trp-2* gene, a *pan-2* gene, a *thi* gene, or an *arg* gene.

16. (original) The haploid fungal cell of claim 12, wherein the heterologous DNA codes for a subunit of a multisubunit protein.

17. (original) A pair of haploid fungal cells according to claim 16, wherein each cell comprises a forcing marker for a heterokaryon formed from the haploid cell, and each forcing marker is the same.

18. (original) The pair of haploid cells of claim 17, wherein the heterologous DNA encodes subunits of a protein having a more than one type of subunit.

19. (original) A pair of haploid fungal cells according to claim 18, wherein each cell comprises a forcing marker for a heterokaryon formed from the haploid cell, and the forcing markers are different.

20. (original) The pair of haploid cells of claim 19, wherein the heterologous DNA encodes subunits of a protein having a single type of subunit.

21. (original) The haploid fungal cell of claim 1, wherein the fungal cell comprises a genetic characteristic that suppresses heterokaryon incompatibility between strains of different mating type to allow all combinations of progeny to form heterokaryons.

22. (original) The haploid fungal cell of claim 21, wherein the fungal cell is *Neurospora crassa* and the cell carries the mutation *tol* , whereby heterokaryon incompatibility between strains of different mating type is suppressed.

23. (original) The haploid fungal cell of claim 1, wherein the fungal cell is *Neurospora crassa* and the recombinant genome comprises an auxotrophic mutation in the *his-3*.

24. (original) A pair of haploid fungal cells according to claim 1, wherein each fungal cell is *Neurospora crassa* and the pair cells comprise a non-complementing pair of *his-3* alleles.

25. (original) The pair of haploid cells of claim 24, wherein the non-complementing pair is K26 and K480 whereby a heterokaryon carrying both alleles fails to grow on media lacking histidine.

26 (original) The pair of haploid fungal cells of claim 24, wherein the fungal cell is *Neurospora crassa* and the cell carries cog^{L} and *lpl* sequences from the Lindegren strain.

27. (original) The pair of haploid fungal cells of claim 24, wherein the fungal cell is *Neurospora crassa* and the cell carries *rec-2*.

28. (original) The haploid fungal cell of claim 1, wherein the fungal cell is *Neurospora crassa* comprising a gene conferring resistance to an agent for selecting against the presence of the recombinant genome.

29. (original) The haploid fungal cell of claim 28 wherein the agent is p-flurophenylalanine.

30. (original) The haploid cell of claim 28, wherein the gene conferring resistance is *mtr*.

31. (original) The haploid fungal cell of claim 1, wherein the fungal cell is *Neurospora crassa* comprising a mutant gene to limit growth on plating media.

32. (original) The haploid fungal cell of claim 31, wherein the mutant gene is *cot-1* C102t.

33. (original) The haploid fungal cell of claim 1, wherein the recombinant genome comprises DNA sequences to enhance production, secretion, or both of a protein encoded by the heterologous sequence.

34. (previously presented) A diploid fungal cell comprising:

a recombinant genome, the recombinant genome comprising a first heterologous DNA functionally coupled to a first eukaryotic recombination hotspot and a second heterologous DNA functionally coupled to a second eukaryotic recombination hotspot;

the first heterologous DNA and second heterologous DNA being adapted and configured within the recombinant genome for recombination.

35. (original) The diploid fungal cell of claim 34, wherein the fungal cell is *Neurospora crassa*, *S. cerevisiae*, or *S. pombe*.

36. (original) The diploid fungal cell of claim 34, wherein the diploid cell is a cell of a filamentous fungus, or a yeast cell, following karyogamy.

37. (original) The diploid fungal cell of claim 34, wherein the first and second recombination hot spot are independently *Neurospora crassa cog*, 3' of *his-3* and 3' of *am* in *Neurospora crassa*, 3' of *his4* and 3' of *arg4* in *S. cerevisiae*, or within *ade6* in *S. pombe*.

38. (original) The diploid fungal cell of claim 34, wherein the first and second recombination hot spots are alleles of the *Neurospora crassa cog* recombination hotspot.

39. (original) The diploid fungal cell of claim 38, wherein either or both of the first and second recombination hot spots are *Neurospora crassa* cog^{L}.

40. (original) The diploid fungal cell of claim 38, wherein the heterologous DNA is located between the *his-3* gene and *cog*.

41. (original) The diploid fungal cell of claim 40, wherein either the first or the second heterologous DNA is located between an inactive mutant of a *his-3* gene and *cog*.

42. (original) The diploid fungal cell of claim 34, wherein the heterologous DNA is a promoter, is a regulatory sequence, is a noncoding sequence, encodes all or part of a subunit of an immunoglobulin, all or part of a heteromultimeric protein, all or part of a homomultimeric protein, all or part of a monomeric protein, all or part of a non-transcribed DNA sequence, all or part of a sequence that regulates the activity of a gene, all or part of a sequence transcribed into

an RNA molecule lacking catalytic activity, all or part of a sequence transcribed into an RNA molecule having catalytic activity, or a combination thereof.

43. (original) A haploid cell derived from the diploid fungal cell of claim 34, the haploid cell arising by meiosis and recombination, wherein the recombinant genome comprises a new sequence combination resulting from a crossover, a discontinuous conversion tract, or an error in recombination.

44. (original) The diploid fungal cell of claim 34, wherein the fungal cell is *Neurospora crassa* of mating type *A* or type *a*.

45. (original) The diploid fungal cell of claim 34, wherein the cell carries pairs of alleles of genetic loci that determines heterokaryon compatibility, whereby progeny of crosses of the cell can form heterokaryons in any combination of like mating type.

46. (original) The diploid cell of claim 45, wherein the fungal cell is *Neurospora crassa* and each cell carries the same allele of the genetic loci *het-c, het-d, het-e, het-i, het -5, het-6, het-7, het-8, het-9*, and *het-10* .

47. (original) The diploid fungal cell of claim 34, wherein the fungal cell comprises a forcing marker for a heterokaryon formed from the diploid cell.

48. (original) The diploid fungal cell of claim 47, wherein the forcing marker comprises one or more auxotrophic mutations.

49. (original) The diploid fungal cell of claim 48, wherein the forcing marker instills to a requirement for tryptophan, pantothenic acid, thiamine, or arginine.

50. (original) The diploid fungal cell of claim 48, wherein the fungal cell is *Neurospora crassa* and the forcing marker is a mutation that inactivates a *trp-2* gene, a *pan-2* gene, a *thi* gene, or an *arg* gene.

51. (original) The diploid fungal cell of claim 47, wherein the heterologous DNA codes for a subunit of a multisubunit protein.

52. (original) The diploid fungal cell of claim 47, wherein the cell comprises two of a forcing marker for a heterokaryon formed from the cell

53. (original) The diploid fungal cell of claim 52, wherein the heterologous DNA encodes subunits of a protein having a more than one type of subunit.

54. (original) The diploid fungal cell of claim 47, wherein the cell comprises two distinct forcing markers for a heterokaryon formed from the cell.

55. (original) The diploid fungal cell of claim 54, wherein the heterologous DNA encodes subunits of a protein having a single type of subunit.

56. (original) The diploid fungal cell of claim 34, wherein the fungal cell comprises a genetic characteristic that suppresses heterokaryon incompatibility between strains of different mating type, whereby all combinations of progeny can form heterokaryons.

57. (original) The diploid fungal cell of claim 56, wherein the fungal cell is *Neurospora crassa* and the cell carries the mutation *tol* , whereby heterokaryon incompatibility between strains of different mating type is suppressed.

58. (original) The diploid fungal cell of claim 34, wherein the fungal cell is *Neurospora crassa* and the recombinant genome comprises an auxotrophic mutation in the *his-3 gene.*

59. (original) The diploid fungal cell of claim 58, wherein the auxotrophic mutation is located towards the 3' end of the gene.

60. (original) The diploid fungal cell of claim 58, wherein the fungal cell is *Neurospora crassa* and comprises a non-complementing pair of *his-3* alleles.

61. (original) The pair of diploid cells of claim 60, wherein the non-complementing pair is K26 and K480, whereby a heterokaryon carrying both alleles is unable to grow on media lacking histidine.

62. (original) The diploid fungal cell of claim 58, wherein the fungal cell is *Neurospora crassa* and the cell carries cog^{L} and *lpl* sequences from the Lindegren strain.

63. (original) The diploid fungal cell of claim 58, wherein the fungal cell is *Neurospora crassa* and the cell carries *rec-2 in both chromosome sets.*

64. (original) The diploid fungal cell of claim 34, wherein the fungal cell is *Neurospora crassa* and comprises a gene conferring resistance to an agent for selecting against the presence of the whole plasmid.

65. (original) The diploid fungal cell of claim 64, wherein the agent is p-flurophenylalanine.

66. (original) The diploid fungal cell of claim 64, wherein the gene conferring resistance is *mtr.*

67. (original) The diploid fungal cell of claim 34, wherein the fungal cell is *Neurospora crassa* and comprises a mutant gene to limit growth on plating media.

68. (original) The diploid fungal cell of claim 67, wherein the mutant gene is *cot-1* C102t.

69. (original) The diploid fungal cell of claim 34, wherein the recombinant genome comprises DNA sequences to enhance production, secretion, or both of a protein encoded by the heterologous sequence.

70. (withdrawn) A plasmid comprising a truncated *Neurospora crassa his-3* gene and a *Neurospora crassa* recombination hot spot functionally coupled to a heterologous DNA, a multiple cloning site 3' to the *his-3* gene, and a marker gene;

the plasmid being adapted and configured for transfection of a *Neurospora crassa* cell.

71-127 (canceled)

128. (new) The haploid fungal cell of claim 1, wherein the recombination hotspot is *Neurospora crassa his-1.*

129. (new) The haploid fungal cell of claim 1, wherein the recombination hotspot is *Neurospora crassa nut-2.*

130. (new) The haploid fungal cell of claim 1, wherein the recombination hotspot is *Neurospora crassa* near *pyr-3.*

131. (new) The haploid fungal cell of claim 1, wherein the recombination hotspot is *Neurospora crassa* near *sn.*

132. (new) The haploid fungal cell of claim 1, wherein the recombination hotspot is *Neurospora crassa his-2.*

133. (new) The haploid fungal cell of claim 1, wherein the recombination hot spot exists in Aspersellins nidulans.

134. (new) The haploid fungal cell of claim 1, wherein the recombination hot spot exists in *Schizophillum commune.*

135. (new) The haploid fungal cell of claim 1, wherein the recombination hot spot is *Saccharomycis cereviseae* HOT1.

136. (new) The haploid fungal cell of claim 1, wherein the recombination hot spot is close to the major histo compatibility focus in *Mus muscles.*

137. (new) The haploid fungal cell of claim 1, wherein the recombination hot spot is near a gamma globular 10ci in *Homo sapiens.*

138. (new) The haploid fungal cell of claim 1, wherein the recombination hot spot is near a gamma globular 10ci in *Dan troglodytes.*

139. (new) The haploid fungal cell of claim 1, wherein the recombination hot spot is near a gamma globular 10ci in *Homo sapiens* is in the region of the repeat sequences associated with Charcot - Marie - Tooth neuropathy in *Homo sapiens.*

140. (new) The haploid fungal cell of claim 1, wherein the recombination hot spot is near a gamma globular 10ci in *Homo sapiens* is near the retinoic acid alpha receptor gene in *Homo sapiens.*